

Center for Strategic and International Studies (CSIS)

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Subject: Tectonic Shift: Security Implications of the New Energy Landscape

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FRANK VERRASTRO: So, good morning and welcome. I'm Frank Verrastro. I'm senior vice president at the Center for Strategic Studies. More importantly for today's session, I also am director of the energy and national security program.

And it's my real pleasure to have this opportunity to discuss what we view as kind of tectonic shifts going on in the energy marketplace. And the panel that we have for you this morning, I couldn't think of three better folks to discuss this very important subject.

I know some folks are still in the back picking up coffee after the first session. If you want to come up and come closer to the front, you're certainly welcome to do that. I would ask one thing is that you turn off your cell phones at this point, just out of courtesy to both the panel and the folks around you.

We'll have ample time for kind of Q&A at the end. I've got a short presentation just to frame, and then we'll kind of move on from there.

The session that we're going to talk about this morning – most of the folks, as I look out on this panel, have been involved in energy for decades, and we think that there actually are a number of shifts that are going on in the energy marketplace, and a lot of the tools that we constructed in the 1970s may not be all that relevant for dealing with today's world. I'm including as you look at the SPR, when you look at refineries, you look at alternative fuels and the scalability and how fast you can bring things on.

So we're going to walk you through what we think are some of the changes that were going on, and then we'll turn to our panelists to talk about the implications of that and how you exactly deal with that; how you address it and what do you do going forward?

The folks we have with us this morning – so John Hess is the chairman and CEO of Hess. Hess is involved in a number of plays around the world – in the Middle East, Latin America, Africa – brings an exceptional both different perspective, business and commercial perspective to the discussion, but also some views on gas, natural gas, and on conventional fuels, pricing of gasoline and whether we ought to have taxes; proactive things that you don't normally hear from folks in the energy industry.

Dr. Phil Sharp – for those of you in Washington, Phil has been around for decades. When I first met him in the '70s – (laughter) – I was just a child at the time. Phil was a 10-term congressman and was on the Energy and Commerce Committee, and was really responsible for putting in place a lot of the landmark legislation – he won't take credit for that now – that we're dealing with today. He is now the president of Resources for the Future and brings a great deal of both economic and environmental perspective. And we're also going to ask him to talk about politics a little bit today.

And then Mike Froman. So, Dr. Froman I have come to learn and admire over the last two years. Mike is both the deputy national security advisor – he's the deputy economic counselor. He spends time doing the MEF, the G-20, the G-8, since he's the sherpa for all things, and he's one of the few people within the administration that has responsibility for both domestic economic issues and then foreign policy, national security issues. So it's a real pleasure to have Mike here with us again this morning.

Let me just take you through what we talked to as kind of framing slides. And unfortunately I'm going to advance this, so if they're stacked and I don't get to exactly where I'm going, be patient. And there's one of the first ones. I'm just going to stack this up to start with.

So, in terms of the key features for the changing landscape – this is stuff that you've heard before. So basically we have a situation where demand is changing. The OECD countries that traditionally were the sources of new demand, it's now moved to the non-OECD, and it's basically Asia and the Middle East.

So we have a new cast of characters. We have a changing resource base, and the resource base is changing in a couple of ways, both concentration of conventional resources – and I'll show you that in a second – and then you couple that up with the costs and the technology and the difficulty, both economic and geopolitically, of getting these unconventional resources, which in fact are enormous. And I know John is going to speak to a little bit of that.

We have the impact of price volatility. And when you look at the energy industry especially, it's historically one that has leads and lags. So there's investment timeframes, and we typically do things in the rearview mirror when we look at prices and we look at demand projections. And over the last couple of years, since 2004, we've really had kind of a watershed of new demand.

The growth in demand year on year from 2003 to 2005 was double what it had been the average of the previous 10 years. And part of that was China but it wasn't all China. And then we hit the volatility of 2007, 2008. We saw the declines as a result of economic downturn in 2009 and '10, and now we're starting to see a resurgence coming back. And this also has implications for our greenhouse emissions because the fuel choices the countries make are extremely important.

We have new players emerging, so it's not only the BRIC countries and it's not only China, but a lot of the institutions that we dealt with that were post-World War II when they were conceived, a lot of the members have changed. So there's a question of whether, as the rules of the road change and the players change, are the institutions capable of dealing with that? And I hope Mike will touch on a little bit of that because we've actually tried to use the G-8 and the G-20 in different fashions as we talk about international negotiations.

And then the projected impacts of climate change. And we'll go through that both for producing countries as well as for consumers, because even if it's not anthropogenic, if you believe that there's another cause, that when you look at the mitigating factors for food,

agriculture, water development and water scarcity, disease, population mobility across countries, the capability of nations to deal with that is going to be extremely important.

OK, so there should be a demand slide here. What this basically shows is that the non-OECD production – or consumption has gone up dramatically, and 50 percent of the new growth is expected to come from China and India. And it's not just in conventional fuels – well, there's the OECD demand – but it's in renewables as well. So it's all fuel forms that we're dealing with.

And this is extremely important because as countries make their investment in fuel choices, when you look at population and GDP growth, this is where the new demand centers are, which then leads to this notion of new realignments. And the question becomes whether China and Venezuela, or China and Saudi Arabia can partner together because of consumer-producer needs, and where does that leave the United States?

There's been a lot of discussion recently about the MENA countries – the Middle East and North Africa. And collectively they're responsible for about a third of global oil production. And they also house a lot of the transit choke points that we talk about.

So, in the case of Egypt, a lot of people were concerned not because of Egyptian production, but because of the volumes that transited the Sumed pipeline and the Suez Canal. And fortunately the military was stepped in and infrastructure was protected. But even when we look at piracy and Bab-el-Mandeb, or if we look at the Straits of Hormuz, these transit issues become extremely important because of the concentration of resources.

OK, can you advance it? There we go.

So, decline curves are the other thing that we talk about frequently in the oil industry. And even if you believe that there's enormous potential out there – and we do; we think there's trillions of barrels out there. I'm not a big believer in the Hubbert curve in terms of global production. When you look at just normal depletion rates and take between 4 and 7 percent of depletion, you have to replace the entire system by 2035 or 2040.

This is an enormous task. And if you add demand growth on top of that, it makes that a lot more difficult. And when you consider the countries that we're dealing with, you have governance and access issues as well. So this is trickily important.

And then we have the conventional versus unconventional. So your blue barrels are unconventional; your red barrels are conventional. What this shows you is concentration of conventional resources – no surprise – Middle East, North Africa, Russia and the Caspian, right? We have a lot of unconvensionals in the Western Hemisphere. This is heavy oil in Venezuela. It's oil sands in Canada. It's the shales in the United States.

But these are technologically difficult and economically difficult to access, and they have environmental implications as well. So we have to be careful about how we do this going forward. But there's an access – a resource-based access issue here.

And then you look at the concentration. So if you take the top 20 producers and resource-holders in the world, there's four that are IOCs. So we're dealing mostly with ministries and national oil companies. And this is a question of access. Where you can get to in terms of the lowest conventional prices are logically in the Middle East onshore.

Some of the unconventional plays, whether it's lower tertiary or shales or oil sands in the Western Hemisphere, but how do you get those economically, and responsible development in dealing with environmental issues?

And then we have global climate change. And I'm just going to stack this real fast. When you take into consideration – OK, hunger, coastal risks, agriculture, migration patterns that could occur – you overlay conflict zones, which are the little black dots – you can readily see that in those conventional producing areas, even though they have a lot of resources, in terms of security challenges going forward, this is a big lift for the United States.

So we don't get 50 percent of our imports from the Middle East. It's a much lower figure than that. And our largest supplier is clearly Canada. But there are some decisions that we have to make going forward to make this work.

So now the good news, so that I don't totally depress you. Efficiency is one of the good-news stories. Lots of opportunity to improve energy intensity and efficiency, some in the Middle East, a lot in the former Soviet Union. But as prices go up, this should be one of the benefits that we see in terms of constraining demand.

Renewables is another huge story. Wind energy has doubled over the last couple of years, but it's starting from a very small base. And if you take out non-hydro portion of the renewables sector, it's less than 5 percent. So, double it, triple it, quadruple it; it still means you need 80 percent something else.

So our policies, even as we need to make the transformation, we need to keep the conventional system robust and healthy also, because it needs to be with us for a long, long time, if for no other reason than capital stock.

Shale gas. This is the other one that's extremely important. And this one, I would argue, that is one of the few places, when you look at the industry's perception of things – I spent 25 years in the industry and we looked at geologic risk, commercial risk, technology risk and geopolitical risk, right, when we assessed where we were going in certain countries.

There's basically no exploration risk here. When you go to the shales, this is source rock. So it's opposed to the situation where you saw oil and gas migrating up and then getting caught by a capstone. That's traditional conventional production. Accessing this is almost like an industrial process. And it's the result of technology, higher prices, access mostly to private lands, but the ability now to access these reservoirs with horizontal drilling and fracking has great, great potential.

The most recent estimate for shale gas deliverability here is 4,000 Tcf in the United States – 4,000 trillion cubic feet. We had the Canadian Energy Resources Board in to CSIS about three weeks ago, and they were saying, for North America, their new estimate is 10,000 Tcf. To me that's close to infinity, 10,000 trillion cubic feet.

But accessing this is going to be really important, and you have to do it the right way. It has to be responsible development on the surface, casing to prevent contamination of aquifers and groundwater. Well design has to be better. And then water management at scale clearly needs to improve. And this is the responsibility of the industry.

On a global basis, this unconventional gas play is also huge. So this is tight seam, coal seam gas as well as shales. And this afternoon, back at the Center for Strategic and International Studies, we are hosting the IEA to put out their international gas study. And their new story is that global gas is big.

But, again, they're probably 15 years behind the United States because they don't have the infrastructure, they don't have the independent sector, and they don't have the pipelines and the steelmakers and the capability to actually do this. There's also an issue about whether or not you own the mineral rights, whether you can access this.

In the United States alone, when we first started looking at shale gas – this goes back two-and-a-half years – we saw maybe the top three finds, and it started in the Barnett. We then went to the “magnificent seven” and the top 10 and the best 12, and now we're over 25. So the plays seem to get more prolific.

The Marcellus alone, which you've all heard of, extends from Southwest New York State down to Kentucky. And the Utica trend, which is above and below the Marcellus in some places, may go up to New England into Northeastern Canada – a huge resource.

But the difference between the West and the East is not only some good news/bad news. You're close to consumption centers and infrastructure but the East is densely populated. We have a different view of property values, noise contamination, road construction, that kind of thing. So it may be a limiting factor. The resource base is enormous; may not get to exploit it fully.

And this is a change in circumstances, so we constantly talk about this when you start stacking up different oil production and what the prices look like. The notion that you can get a lot of new gas and gas liquids in the space of between 4 (dollars) and \$6 an Mcf can totally change the dynamics over time.

So we may not be looking at electrification for fuel; we may be looking at gas substitution or gas liquids to go to the refining stream. And this is something people are exploring now as gas prices stay low and oil prices keep rising.

Finally on prices. We've been looking at the fundamentals – the fundamentals of pricing. And it used to be traditional fundamentals were oil supply, oil demand and inventory. Where do

you put it? And now it's expectations of the future as much as the current situation. Part of it is speculation and investment. Part of it's what policy changes look to make on the horizon. Climate change, access to security infrastructure, timelines are also important.

All of these things I would say constitute the new fundamentals, which leads us to the final slide, and our final slide. And we constructed this for the Petroleum Council study a couple of years ago. And this is the notion that when you balance energy needs, you have to look at foreign policy, national security at one corner of the triangle; economic needs, because that's very important; and then the environment.

But within that space, all the debates and tradeoffs go on. So there's no fuel that has no risk, and requires investment in infrastructure. But that's the policy space that we're going to be debating, and that's the source of our discussion today.

And with that, I would like to bring forward John Hess. Thank you very much.
(Applause.)

JOHN HESS: I think Frank did an excellent job outlining the energy challenge that we have. And, John and Frank, I'm honored to be here, so thank you. I will do my best to provide some remarks about the energy landscape, but also maybe some of the geopolitical security risks that we face as we deal with energy.

The United States desperately needs an energy policy. It is fundamental to our economic growth, our environmental sustainability and national security. Current political disruptions are a reminder: We need to secure our energy future. It's paramount to the future of this country.

We should not wait for a crisis to do something so important to our national interest. With 5 percent of the world's population and 20 percent of its energy use, the U.S. has an obligation to lead globally, to set the right example at home.

We must act now. Industry must do a much better job to educate political leaders and inform the public. It's, by the way, one of the reasons I come to an event like this, because we need to be much more informed about the challenges we face and the difficult choices we have yet to make.

The president also – and it's great that Mike is here as well – must lead and set a strategic vision for our country to follow. When President Obama took office two years ago, he put climate change at the top of the agenda. However, to have climate change and policy associated with it, you need an energy policy.

Unfortunately, people confuse climate change policy and energy policy. You need both for sustainable development, and it starts with energy policy itself. I remember Speaker Pelosi talking: Well, we just passed the energy bill, Waxman-Markey. That was not an energy bill; it was a climate change bill, and we need an energy bill to go along with it.

And one of the problems is a lot of the political leaders just don't understand the challenges of energy itself. So what I'd like to do now is maybe complement some of the remarks that Frank was talking about and just talk about some of the pragmatic realities that we face when it comes to energy.

Eighty-five percent of the world's energy is hydrocarbons: 35 percent oil, 30 percent coal and 20 percent natural gas. The world population is currently estimated to be 6.9 billion people, and it's estimated to grow to 9 billion by 2050. And, again, Frank was talking about this theme before.

Most of that is going to be in developing countries. And as their living standards improve, they will need hydrocarbon energy to provide their economic development. Renewable energy is needed, and should be encouraged, to meet future energy demand and reduce our carbon footprint. However, hydrocarbons will fuel world economy for many decades to come.

Renewable energy does not have the scale, the timeframe or economics to materially change this outcome as much as we would hope. So when we talk about 5 million green jobs, yes, we should have them. But don't let that lull you into a false sense of security that we have an energy policy to deal with the hydrocarbon challenge that the world has and our country has.

We need to encourage renewables wherever possible, and add to our portfolio of energy supplies, but we have to realize that they are high-cost, they're going to play a limited role for the next 20 years, and we are going to need many incentives to make sure that they have a chance of competing economically in the future.

An energy crisis is coming, likely to be triggered by oil. Demand – and Frank was talking about it – is likely to grow in the range of a million to a million-and-a-half barrels per day, driven by the developing economies of the world and the growth in transportation. Estimates are that we will go from 1 billion cars today to 2 billion cars in 2050.

As Frank said, we're not running out of oil. A trillion barrels have been produced, approximately 2 trillion barrels remaining. But we are not investing enough to grow capacity to keep up with demand.

Frank was also showing that slide that showed 80 percent of the world's reserves being controlled by national oil companies and governments and not getting access to those reserves. Many of those countries are not investing enough to grow their capacity to keep up with the demand projections five and 10 years from now.

World supply capacity excess right now is about 3 million barrels a day. It was 4 (million) with Libya. Without Libya it's about 3 (million). As demand grows in the next decade, we will not have oil production capacity needed to meet the demand. Supply will ration demand and prices will skyrocket. A hundred-and-forty dollars per barrel just three years ago was not an aberration; it was a warning, and we need to wake up about it.

So what can we do about it? In our country I think we can do a lot. Oil is 37 percent of U.S. energy demand. And the whole story here is about transportation. It's about 70 percent of transportation.

So the first thing we should look at is demand. A number of political leaders are vilifying producers right, left and center, whether it's in the country or whether it's internationally. That's not good policy. It may be good politics. But first we need to take some responsibility.

We need to conserve more. We need to raise mileage performance standards to 50 miles a gallon, much higher than the 35 miles a gallon requirement for 2016. And we need clarity on those regulations, and we need to get those regulations out there and committed to.

Focusing on energy efficiency is the best investment we can make, a combination of vehicle mix, engine downsizing, aerodynamics, advanced combustion technology and hybrids. But the key mover here is hybrids. Hybrid electric cars, as the Chevy Volt, and hybrid gasoline cars, as the Toyota Prius, will go a long way to get us there.

If we adopted this standard as soon as we can and introduce it over time with the automotive industry, and taking 15 years to replace the vehicle fleet of 230 million cars and light-duty trucks that we have, we could save 3 million barrels a day of oil. And at today's price of \$100 a barrel, that would save over \$100 billion each year, a worthy objective and a worthy price.

Now, there's a lot of promise and talk about electric-only battery cars. People hoping for specific outcomes for battery-powered cars without understanding today's technological limitations really mislead the public. Currently the battery challenge is both range and cost: range in most cases limited to 40 miles on an eight-hour charge, and the cost of more incrementally of about \$10,000 per car. And that's with automotive companies subsidizing the electric car itself.

The problem here is physics. Energy density of today's best battery is about 200 watt hours per kilogram, versus the energy density of gasoline, which is 13,000 watt hours per kilogram. No wonder we have a physical problem in the limitation.

So electric-only battery cars are important. They will serve urban short distance driving. But they're not going to help us in the interstates that we have and the long-distance family drives that we make, especially in the summer. And they're not going to play a major role as battery-only cars in the next 20 years. So hybrids are the technology we should focus on, and we should get after it. And it will be worth the saving that we make, even though it's going to cost us in the short run.

Now, let me talk more about the supply side. We need to maintain the tax provisions that incentivize drilling in our country. Our country needs to encourage more drilling to increase our energy security. We'll never be energy independent, but we certainly – and the whole purpose of this conference today is about security. So we're talking about energy security here.

In 2010, the industry spent \$135 billion in intangible drilling costs. The industry drilled over 40,000 wells, most of them onshore, by the way. These are the current cash operating costs of drilling a well. They're not a tax break and they are not a subsidy. And there's a lot of misinformation out on this subject. So, if we have tax reform, we're all for it, to make the U.S. more competitive, those costs are cash costs.

And what's also interesting to note is that 90 percent of the drilling in the U.S. is done by independents, the balance by the major oil companies. So if we change the tax provision on intangible drilling costs, you're going to be hurting the small businesses in this country, not the big oil companies.

So it's bad policy and it's misinformed policy. Eliminating those IDCs will decrease our domestic supply, increase our foreign imports, hurt our balance of trade, decrease jobs and decrease energy security.

Let's talk about the offshore a little bit. We need to encourage more drilling to strengthen energy security, including proper regulatory oversight to ensure the protection of the environment and to reassure the public. The Macondo accident was a tragedy with a significant loss of life and continuing environmental impact.

The Gulf of Mexico currently supplies about 30 percent of our crude production and 13 percent of our natural gas production, mostly from the deep water. So when certain people say we gave out permits on shallow water drilling, it's meaningless. It's the deep water permits that matter, and there we are doing a poor job. Even though the government is trying to do better, it is not up to the standards that we as Americans deserve.

Since the moratorium's been lifted, only 15 permits have been granted for new exploration or production wells. The government should put the industry back to work. Progress is glacial. Twenty-five deepwater drilling rigs are waiting to return to normal operations. Over 200 permits are estimated to be in queue. Ten (thousand) to 20,000 jobs are at stake. The rest of the world is drilling and the U.S. is watching and is paralyzed.

The industry has gone a long way to building spill-response capability, meeting the challenge with the Marine Well Containment Company and the Helix Well Containment Group. We need the political leadership and courage in Washington to give the industry the green light to go back to work. America deserves better.

We must do all we can, not just here but in the world, to increase oil supply. While non-OPEC has peaked, supply burden in the future will fall on OPEC, specifically Saudi Arabia and Iraq. And this is a major security issue, obviously.

While we want to reduce our dependence on foreign oil, it serves nobody's purpose to vilify those producers or producers here either. We need to strengthen our relationship with those that have the reserves. Frank showed that 80 percent chart up there.

A major security issue going forward, – and obviously this is something that we need to be very mindful of – is 25 percent of the world's oil production is with those Mideast OPEC countries, but two-thirds of those oil reserves are with those countries, and 20 percent of the world's oil production goes through the Straits of Hormuz. So there's some major security issues there that we need to think about as a country in how we deal with that.

Now, talk about natural gas for a second. Frank talked about shale gas being a game changer, and he did a very good explanation, talking about the difference in shale as a source of hydrocarbons and the lower risk geologically of getting access to it.

The hydraulic fracturing that's out there has been around since 1949. It is not a new, recent technological development. Those 44,000 wells that are drilled in the United States, about 80 percent of them are hydraulically fractured. So as increasing industry activity occurs, obviously higher standards are going to have to be put forward.

But the states regulate hydraulic fracturing, and outside of one or two rogue companies that aren't up to the snuff of operations, the industry has had an outstanding record of safety, of not contaminating groundwater, and of environmentally being very secure in their operations. So there is, again, a lot of misinformation out.

Now, shale gas is a game-changer. It has fundamentally changed the economics of electric generation. Natural gas is no longer a bridge fuel, but basically a destination fuel used for power. Five years ago shale gas was approximately 5 percent of U.S. gas production. Today it's 30 percent.

The United States will be self-sufficient in natural gas for many decades to come, rivaling the gas resources of Russia, Iran and Qatar. And also, when you think about security, while current oil production for the top 12 OPEC producers is about 40 percent of the world's production, natural gas is actually more concentrated in fewer hands. The top 10 producers, including the United States, of natural gas actually are 72 percent of world production.

So, as the world needs more natural gas, we actually have security issues because even more of those gas reserves are concentrated in fewer hands. That will be a problem for us to face I think over the next 20 years.

We need to prioritize natural gas for electric generation. It is much lower cost and much higher efficiency. To build an electric plant of a thousand megawatts, for natural gas it would cost about a billion dollars, take about a year and half. For those same thousand megawatts, coal would cost \$3 billion in three years, and nuclear would cost 6 (billion dollars) to \$8 billion in six to eight years.

So people talk about nuclear because of clean energy, but if we're serious about helping our economy be competitive, natural gas is the way to go. And so, as the United States has about 600 coal plants, about a third of which are 50 years or older, more and more of our future generation, as old generation gets retired, should be on natural gas.

Nuclear, while we should preserve our capability for 20 percent of our electricity generation, to be most economically competitive I think the future is in the natural gas category. And, again, clarity in terms of what our regulations are so the electric industry can move forward I think would be helpful on the government side but also the industry's side.

Another point. There are some people, specifically Boone Pickens, that argue that the government should give about \$60,000 a truck subsidy to convert 18-wheelers to natural gas. That's just stupid policy. You have 2 million trucks in the United States, \$60,000 – \$120 billion a year to make trucking companies use something that's worth \$30 a barrel versus \$100 a barrel. You don't need government incentives, especially in our deficit environment that we're in, to convert trucks or cars or heavy duty – light duty trucks to natural gas. The free market will get us there.

But the one inconvenient truth that we deal with is that natural gas is much better suited for electric generation. If you use it in a power plant, you have 40 to 50 percent efficiency. If you use it in a car, it's 15 percent efficiency. So for the future of our children and our grandchildren, it's much smarter to use natural gas for electric generation as opposed to transportation. It doesn't mean we shouldn't use it for transportation. I think fleet vehicles in cities with short distances where the infrastructure is there makes infinite sense.

Now, talking about electricity a little bit, we need to talk about coal. Coal is going to be there for the next 50 years to the next hundred years. People talked about "king coal" having its demise after World War II, and it's still here. The U.S. is self-sufficient in coal. So it's going to play a role in electric generation for many years to come.

It's 15 percent of U.S. electric generation right now. But the real issue with coal is its CO₂ footprint. Unfortunately Al Gore's words ring true: "Clean coal is like healthy cigarettes. It does not exist."

So, as we go forward, those older coal plants that I talked about, they should go to natural gas. And that would create a demand for natural gas of somewhere between 15 and 25 percent, incremental from where we are today. And we should have the clarity on how we're going to use that gas before we should start pushing it in terms of transportation usage.

I talked about nuclear a little bit. The big problem in nuclear is the cost issue, notwithstanding the recent tragic events in Fukushima. So, I think we just have to be realistic. We don't want to get rid of nuclear, but I don't think it's going to be playing a major role as we go forward.

There are a few states that are pushing it forward with their electric utilities. The costs are great. In some cases a company like SCANA in South Carolina is almost paying for a nuclear plant what their market capitalization is. So the costs of nuclear is high, and there are just only so many companies that can afford to make that investment.

I talked about the limited role that renewables will play. Wind is about 2 percent of our power generation. If it got to 10 percent in the next 10 years, it would be a lot. What's the

problem with wind? What's the problem with solar? It's intermittent. You're lucky if you get utilization 30 percent of the time. It's not base load. It's not going to make your car run and it's not going to keep the lights on for 24 hours.

And it's also higher cost. Electric power from wind is somewhere between 9 (cents) to 11 cents per kilowatt. If it's natural gas, it's 3 (cents) to 5 cents a kilowatt. That 9 (cents) to 11 cents gets a tax credit from the government of about 2 cents. We need the wind, but one of the problems is it doesn't blow when you need it, quite often.

And in Texas, where there is a surfeit of electropower from wind, what you have found is that last summer, on the hottest day in Texas, 7,000 megawatts capacity was there. Only 600 were available because the wind wasn't blowing.

So, wind is important, solar is important, but we can't lull ourselves into a false sense of security that that's going to be the ultimate answer. It plays a role. Biofuels, bad policy. Someone should do something about it. Six-billion dollars a year to encourage farmers to convert food to fuel. It's stupid. I don't know why we perpetuate it. If we can just keep the rules where they are, I think it will be a step forward.

Last but not least, climate change. A lot of aspirations here by a lot of different political leaders. Recent proposals to reduce the carbon footprint, the CO₂, for emissions by 80 percent by 2050. It's simply impossible. It's not an oil or gas executive saying, oh, climate change doesn't matter. It does matter. But we need to be realistic in the targets that we set, and we need to integrate, as I said before, climate change policy with energy policy.

A Princeton study that was done called the Carbon Mitigation Initiative sets forth initiatives to mitigate the impact of CO₂ – 60 miles a gallon, tripling nuclear plants from 400 to 1,200 in the world, building 800 CCS plants – by the way, there's zero right now; that's carbon capture and sequestration – and increasing wind power 15 times from the current rate. You know the problem with that? In 2050 your CO₂ footprint will be the same that it is today.

So if we did all those initiatives, and we should, we won't be any better than we are today. So we just have to be realistic, as the world economy grows and it needs hydrocarbons, what the impact on CO₂ is. There is lot we can do to decrease emissions. There's a lot we can do to mitigate, but we have to set realistic targets.

There is one other issue there even if the U.S. and Europe went to zero: China. China currently, with 10 percent of the world's GDP – we have 25 percent – already emits more CO₂ than we do. And, left unabated, China will probably triple their CO₂ emissions as their economy grows between now and 2050. I would say that's a security issue too.

So, we have to get them in the tent. I know my colleague here is trying to influence them on CO₂. I support those efforts. And I think the G-20 is a perfect way to try to increase our influence over them because we all live in the same Earth and we all share the same resources. But right now we're on a collision course just in terms of CO₂.

I think we're also on another security collision course because they make energy policy an integral part of their national security and of their foreign policy. Just in the last three years, China has spent \$45 billion across the world to buy oil and gas reserves. They've done it in Canada, they've done some here, they've done it in Latin America, they've done it in Asia, and they've done it in Africa. So our country better wake up that there's a scramble for resources out there, and that's another reason we need an energy policy.

So, in conclusion, energy and climate change have been called the greatest challenge we face in the 21st century. We can no longer pursue short-term political agendas. We must collaborate – Democrats, Republicans, government and industry, the United States and the rest of the world – for the common good. We need to set the example here at home, and we also need to make it a top agenda item. It was. It's fallen down. I'm hoping it can get back in the top five and we also can do it for the G-20.

We need an energy policy that decreases the demand for oil, encourages more drilling, emphasizes natural gas for electric generation, invests in research for new forms of energy, and sets realistic targets for reduction in CO₂ emissions. If we do that, we can serve over – it can serve over 3 million barrels a day, \$100 billion a year, and reduce not only our carbon footprint, but also start doing something about our deficit.

Our country needs the leadership from both industry and government, and together we can create an energy future that secures our economic growth for the future generations. Thank you very much. (Applause.)

MR. VERRASTRO: So, when we invited John, let me just say that we thought he would be thoughtful, provocative and entertaining, and I can say check, check, check. (Laughter.) Nice job.

Phil Sharp is joining us this morning as well. So Phil, in his current role as president of Resources for the Future – we've done a lot of work with RFF. Many of you out there have done it as well. Resources for the Future, not taking anything away from CSIS, does one of the best jobs of economic energy and environment work in town. They gave the administration Billy Pizer, Joe Aldy – a number of different people that worked out serious thought on how to go forward on some of these issues.

So it's my pleasure to welcome Phil Sharp. (Applause.)

PHILIP SHARP: Thank you very much, Frank. And thank you so much for inviting me here. Frankly, as a former member of Congress, I'm happy to be invited about anywhere. (Laughter.)

But this morning I was asked if I would make a few comments sort of about global energy and environmental issues that begin to have a security consequence, and I'm going to try to do that in just a very broad – at the stratospheric level, where you can rarely make a mistake when you're that high, flying in an airplane – the comments, and then bring it down and talk –

make just a couple quick comments, one about natural gas, which is a clear theme here this morning, and the other about nuclear.

Let me just say in the broad context, when I was a graduate student in the last millennium at Georgetown University – this was the 1960s – one of our – our ambassador to the United Nations coined the phrase, revolution of rising expectation – “revolution of rising expectations” as a way to describe what was happening in the non-developed world, which at that point was most of the rest of the world other than Europe and the United States and Japan kind of proposition.

And so, we never could find non-patronizing terms for that part of the world. In most of American conversation they were viewed as undeveloped or underdeveloped or developing or something of the sort. But the point was he was trying, and the U.S. government was trying, to get more national attention to the importance of this part of the world, a very large part of the world.

But the primary focus in the American foreign policy and security establishment was naturally on the question of what was the Soviet Union doing, what was the impact on the competition between the United States and the West, and the Soviet Union – communism and capitalism?

And so, that was the overwhelming focus and lens. And, by the way, most of the parts of the world did not seem to have high relevance for us – oil in the Middle East, various strategic points where ships flow and things of this sort. But, frankly, it was not the highest order of a security issue.

Well, today the revolution of rising expectations actually has more relevance because we have seen a radical change in what is expected and what is happening in much of the rest of the world. And, indeed, that was what Frank and then John too were talking about, these enormous developments abroad.

And these are in the realm of economics, where something that almost nobody predicted back in that era was the radical shift in the way India, China, Brazil and others are now leading the global economic engine essentially there.

We see it now of course on the political front, where it's getting a special current revolution in North Africa and in the Middle East, where there are different kinds of expectations for what people want in political leadership.

And, interestingly enough, we also see it on the environmental front, a phenomenon that has been documented. It's pretty universal in social development. And that is, once economies get going, citizens who get what we would call middle class in America begin to demand, oh, I want that water to be cleaner for the health of my children and myself. I want that air to be cleaner. I begin to demand quality of life expectations.

And, as we know, this is an intense issue that China is dealing with in which the popular expectation, at least in certain factions and certain geographic areas, is intense over – that the government is having to deal with.

Well, at heart and soul we recognize that in fact we've coupled significant population growth and trends with significant economic development. And the consequences of that of course are many-fold, but one is the intensification of global competition for resources, whether it's energy, water or food, and we see also, because of the scale of human activity, very significant imposition and damage to the environment around the globe, because simply the scale of our activities, both some individual activities but the collective, is enormous on our resources and on our environment.

Now, there are two very large commons – there may be one – commons problems, meaning that these go well beyond anybody's ability to unilaterally control what is important to them, and one is the atmosphere and the other is the oceans. You can think of perhaps other regional ones, but in which what we do contributes to, matters. But as John was even saying on the climate issue, obviously without the engagement of China and others, we are doomed to not be able to make a significant shift on what we are putting in the atmosphere.

And of course in terms of the atmosphere, climate is one of those things which we won't go into here, but the other that is, I think, going to be a growing sense of international conflict – in some places it will just be nations that sit next to each other – but it is, in fact, what people are putting up into the environment out of industrialization going on around the world.

We have done it to the Mexicans and the Canadians. They have done it to us. We have done it to Europe. But now we're able to monitor mercury coming from China, and other kinds of things, not to mention we were able to pick up the nuclear response in – on the East Coast of the United States, we could tell there had been an accident in Japan. It wasn't viewed as a health-threatening thing in any way, shape or form here.

But the point is, what happens elsewhere is not irrelevant, and I think we're going to see multiple conflicts around the world over this. Whether they reach the point of military is a whole other question, but they certainly are things that governments are going to be called on to deal with.

And of course the oceans, where we face over-fishing and we face over-dumping. It is the grand sewer in which we think that we can dump, all around the world, all kinds of stuff. And because of its size, for a long time frankly we probably could.

But we're beginning to recognize that the scale of human activities is actually changing the chemistry of our atmosphere and of our oceans, and we're not quite sure what all those consequences are, from alarmists who think it's really going to be devastating on both fronts, to others who take a more casual view.

But the issue that I'm trying to suggest is, this is a changed world, and the shift that I mentioned on economics and politics is also – as Frank said, it is the players, that we have seen a

huge shift in only a decade or two decades of where the financial and political power has arisen in what we used to call, when I was a student, the developing world.

Well, let me change to the – bring the plane down a little bit and talk about natural gas and nuclear in particular.

First of all, I think that natural gas has the potential to be, in this country and around the globe, a changer – a game-changer in the things – and of course we have the issues of access that we've got to deal with here to make that so. And it's clearly, in the United States market, going to have an effect on the development of other resources – coal, renewables and nuclear, which John outlined – and it has an effect on our potential to do something about climate change.

But there is lots of policy development that has to occur in order for this resource and its potential to be capitalized. Now, the interesting question is whether or not it's going to have – and John articulated how the concentration of gas resources may be something on the horizon globally – concentration that is going to be of concern to us.

One thing you will notice is we are going to be big players in that no matter what is happening elsewhere, and we're certainly leading in that today. But let me suggest to you there are lots of ramifications we are yet to work out. I mean, Poland wants to aggressively go after this. I don't know what their real potential is, but they're excited about that potential and they certainly see them being an alternative to Russian gas, or at least not a direct alternative, just the fact that they're there.

And I would suggest to you that one of the profound things here is whatever speed we would develop these at, they are there and they are known to be there as resources, and they are going to be a magnet to economic and political leadership for the next 10, 20, 30, 40 years. So, whether they get developed next year or not, they're always there as a potential check.

I think the interesting question is whether it will ever be sufficient to actually check what happens in the oil market. It certainly is going to have an effect on the other markets, and it may well have an effect on pricing in oil ultimately.

But there are many uncertainties with this, and I think there is one lesson of humility. Partly I tried to articulate it in what I said before about how the world changed, but it is our ability to see what the world is going to look like 25 years from now is really quite limited. And we had a radically different world we were dealing with in the 1960s when I was a student.

And we, by the way, when it came to natural gas, in 2004, when a Republican president, and a Republican Congress dealt with an energy bill and aggressively moved forward with U.S. energy policy, they assumed natural gas was not a growing phenomenon in the United States.

In 2007, when we got the other – we had 2005 and then we got the 2007 bill, which was both parties were involved because there was a redistribution of power in Congress – guess what? The same attitude – we've got to get liquefied natural gas into the country because we don't have this supply – beginning to hear sounds that maybe this was a supply. 2009, with the

stimulus package, there was more belief that it was out there but certainly it was not part of the debate over what had to be developed.

The point is, this comes as a huge change in the way we think about, organize, and the potential consequence of the real results, and we generally didn't know it. It also, by the way, advertises why it is so important, one, to keep research going in the private and public sector, and, two, keep a reasonably open marketplace, because if you would ask the big oil companies if they were investing in this, they would have pretty much said, no way, we don't think it's going to happen. It's not where the big stuff is.

And what we had was independent, smaller companies who went out there, placed the bet against some of their friends and colleagues, laughing at them, and they made not only money for themselves; they made a big change for this country and for the world.

But there are many uncertainties that lie ahead. Let me turn quickly to nuclear because – and suggest here a more concrete thing about how the United States and other governments need to aggressively move – seize this opportunity, given the severe accident at Fukushima.

First of all, this is the opportunity now for industry, for government, even NGOs, to help us build a better, stronger set of institutions, private and public, on an international setting, in order to help assure the safety of these plants. And it has the potential also, meaning that nuclear can be a part of our future supply, because we don't know how we're going to meet everything in 2050, whether it's for emissions or for energy supply.

And here there are techniques that are underway but need to be strengthened in information sharing, they need to be strengthened in best practices that go on, and, very importantly, in effective oversight by regulators and by private – the regulatory system.

In the United States, one of the most effective institutions that industry has developed in conjunction with government is called INPO. And while it's like every thing else, imperfect, in the world, it has had a huge disciplining effect. Its counterpart on the international scene is called WANO, which is a much weaker kind of thing, which is the World Association of Nuclear Operators.

But this is the opportunity to strengthen that. The same with the IAEA and the NRC. This is a tough, tough technology that takes constant discipline, constant oversight, and constant allowing for critics to raise questions about it. But it has performed and it's a marvelous amount of energy out of a very small quantity of material. And it has – at least for the climate, it has – carbon free.

So, I think we're probably not going to – I certainly personally would never advocate that we rule it off as an option in the future, but we should seize this opportunity now. And this requires leadership at the State Department, it requires leadership in the industry, and this is – there are many of these things actually underway, and I think we need to seize the moment to help effectively over that.

Well, let me just quickly close by saying the obvious, which is what John and Frank have said. On the world scene, and the kind of things this country and other countries' governments are going to have to deal with – and everybody else is going to have to deal with – are large energy and environmental questions over the next several decades.

And I think what that means back here at home is that we need to be alert within the U.S. government and those who deal around the government with making sure we are building the intellectual and administrative capacities in our foreign establishment, our foreign policy and security establishment, to be able to effectively and persistently stay on these topics, and be very careful that just because we don't have a crisis, we starve the resources in these critical agencies.

Well, thank you very much. (Applause.)

MR. VERRASTRO: Thanks, Phil.

Phil brought up a couple of great points, but this notion of where governments are vertically organized and companies are vertically organized, how do you deal with transnational threats that are really horizontal? And that's one of the things we want to get into.

He's also the classic person that exemplifies kind of the dual-hatted nature of this town. What he didn't tell you is that he also chairs the policy group on the National Petroleum Council Resource Study, which I know from experience is good news and bad news. It eats up your life but it's a great intellectual pursuit.

You talked about government-industry collaboration and how the government needs to get its act in order in dealing with climate change in the economy and energy. And we have the person that's going to talk to you now and give us all the answers on that. It's my great pleasure to introduce Mike Froman. (Applause.)

MICHAEL FROMAN: Well, thank you, Frank. And unlike John and Phil, I've not been steeped in energy policy for decades, as he was kind enough to introduce Phil by referencing his decades. In fact, most of what I know about energy has come from Frank. And so, I view this more as a final exam rather than a presentation, as he's been my tutor here.

I apologize. You may have seen us violently BlackBerrying back and forth here a few minutes ago. You know, it's an interesting time to be meeting. The OPEC meeting in Vienna just broke without an agreement. And Minister Naimi described it to the press as "the worst meeting" he's been to.

So, it's an interesting time for us to be talking about these issues. Between that, between the historic changes going on in the Middle East and North Africa, the increasing demand from emerging economies, as Frank laid out, the triple emergency in Japan, the mixed economic news in the U.S., in Europe and around the world, and oil and gasoline prices here that are having a significant impact on American families, on consumers, on consumer confidence, which in turn has an effect on the broader economic growth projections.

Frank described my job of being at this nexus of national security and economics, domestic and international, and I guess I do want to emphasize that that is the way the administration views these issues.

We see a nexus between national security and economic security, that to project the sort of power and influence we wish to project around the world, we need to have a strong U.S. economy, and that U.S. economy is dependent, in turn, on a strong, open, rules-based global economy. So much of what we do is focused on trying to support that global economy.

But that economy is also – that economic security is also dependent on energy security, and that energy security is related to climate change, and that climate change is related back to national security. So all of these things, in fact, are interconnected, and we can no longer afford to look at things in a vertical way but really do need to look at things in a horizontal way.

John was kind enough to suggest we get an energy policy for the administration, so I thought I'd take a minute or two to lay out what we think our energy policy is. And, actually, it was terrific. He – if I've got it right, John – he said it needs to have drilling, gas, clean energy and a realistic approach to climate change. And that happens to track my remarks directly – (laughter) – so I don't even have to – I don't have to reorder it.

You may have seen the president's speech at Georgetown University a couple of months ago, and the blueprint for a secure energy future that was laid out at the same time. And that's a pragmatic policy that we believe is based on three principles.

One is safe and responsible oil and gas development, both domestically and internationally, promoting energy efficiency in commercial and residential buildings, efficient cars and trucks, et cetera. And, thirdly, innovating towards, ultimately, a clean energy future.

But even as we strive for that clean energy future, we remain very conscious of the fact that we will, in the short and the medium term, be dependent on oil. And that is a reality that we – that defines our energy – defines a good portion of our energy policy at step one.

That said, the fact that we import almost 50 percent of the oil we use and export \$400 billion per year creates a meaningful economic and national security issue, as John and others have laid out. And that's been highlighted by the recent turmoil in the Middle East.

As a result, we've placed a great deal of emphasis on working to secure stable and secure sources of supply, both domestically and internationally. Mindful of the Macondo oil spill, we have worked to ensure that future exploration is done in line with the lessons learned from that example.

And while my numbers don't exactly track John's, but I'm going to do some research on John's, we believe that since the moratorium has been lifted, that we have been trying to expedite the approval of gulf permits, consistent with those new higher safety standards, and working with companies to try and do so as quickly as possible.

We're also working to expand exploration in Alaska and the Gulf, and we have tried to structure, or we're working to structure, the leases in such a way with the Department of Interior so that companies get rewarded for diligent exploration and development under those leases.

Internationally, we're working with Mexico on a trans-boundary agreement that will allow us to facilitate the safe and responsible development of oil resources that flow under both our borders. We've commenced a strategic partnership with Brazil to begin a dialogue about the whole range of energy issues with Brazil, but including very much the pre-salt resources, and how we can bring our safety technology to bear there and participate in the development of those resources.

And just this week, the State Department wrapped up the public comment period for the supplemental draft to the environmental impact statement for the keystone pipeline, and expects to reach a decision on that one way or the other by the end of the year.

On natural gas, which Frank explained very well, we do this really as a potential game-changer. But if we're going to take advantage of these new finds, we need to get fracking right.

And while John is right that this is – the vast majority of players in this area do a very responsible job, there are great concerns out there about those safety and environmental issues, and we need to make sure that we're bringing together, as Secretary Chu is now doing, environmental, industry and state regulatory experts to make recommendations about best practices and about how to improve safety and environmental performance.

One thing that was just mentioned in passing, but it could be that shale oil proves to be as much of a game-changer in this regard as shale gas over the long term, and we see that as having great potential, again if we can get the fracking right.

Our interest in natural gas is not limited domestically, as Phil mentioned, with regard to Poland. There are vast resources abroad, and we've launched a global gas shale initiative to work with countries like Poland, like India and others who want to develop their own shale gas resources and begin to change the mix and the patterns of supply and demand. And in just the last couple of weeks, the Department of Energy issued its first-ever permit to export domestic natural gas from the lower 48 to a non-FTA country.

So we have a comprehensive policy – excuse me – that goes from drilling safety here, to expanding resources here, to working internationally with major potential suppliers, to exploiting the natural gas opportunities safely and securely.

There is, of course, also our clean energy agenda, and I won't go into it in any great depth. I think you have probably heard that before about the resources invested in clean energy innovation through the recovery act and since.

But let me say a word about climate change. And I won't go into detail. And Frank had a good slide about the national security implications of climate change. But it does go to this

issue of the changing – or the tectonic shifts in the environment that all of the speakers have touched upon.

In our view, we cannot solve climate change without China, India, Brazil, and the major emerging economies being part of the solution. And we have tried to take a very pragmatic approach to the U.N. negotiations and the other fora to create mechanisms by which all major economies, all major emitters would have a seat at the table, but also have a series of responsibilities for addressing climate change.

We recognize that India, China and the countries in the Middle East will account for the greatest part of the increased demand for resources in the future, and with that comes a series of responsibilities. So, from Copenhagen to Cancun to Durbin, you, I think, have seen the beginnings of a framework where both developing and developed countries take on certain responsibilities.

Those responsibilities may be somewhat different but they each have commitments where there's mitigation, where there's transparency, as well as finance and technology, to address the broad range of climate change issues.

And this is part of a larger thrust of our broader national security policy, way beyond economics or energy or climate change, which is the recognition of a role of the major emerging economies in the global system as a whole. We think that's a good thing that the rise of the emerging economies is a positive development for the international system.

We want to create opportunities for the major emerging economies to play a greater role in the international system. But with that role comes responsibilities, and that's why we committed to institutionalizing the G-20 as the premier forum for international economic cooperation.

It was born out of the financial crisis, but it is evolving – and it's still a work in progress – it's evolving into a forum where you have the major developed countries and the major emerging economies sitting at the table together and working through the difficult issues of what it means to have balance and sustainable global growth going forward, what sort of financial regulation to put in place to avoid the sort of crises that we went through, and, increasingly, how to deal with other transnational issues.

So we may have a slight different point of view on tax credits, but having the G-20 look at fossil fuel subsidies, and the inefficient fossil fuel subsidies that are used in many developing, as well as developed countries, that encourage the overuse of fossil fuels is something that the G-20 has taken on, and we're making step-by-step progress.

And, increasingly, other energy and commodity-related issues are finding their way onto the G-20 agenda. So that forum is becoming one mechanism by which we are integrating the major emerging economies and working with them to take on greater responsibilities for the international system.

I mentioned the climate change forum as another one from, again, Copenhagen being a major breakthrough in terms of developed and developing countries working together to try and solve the problem.

The same thing is true of the Doha trade talks, where we have insisted that the major emerging economies play a role and contribute to the international trading system in a way that is commensurate with the size of their economy and the role in the global economy.

There's much more to do in this regard: raw materials policy; commodity policies; resource diplomacy, as some mentioned; development policy more generally. These are issues – whether it's China's "going out" strategy and how that relates to their energy policy, or other issues – that we want to bring into the G-20 or into other similar fora and begin to create some discipline around those.

You know, let me conclude by just saying, about oil prices, current oil prices and oil markets, we are concerned about the impact of current oil prices on the global economic recovery, and we are monitoring it closely.

We understand there are lots of reasons that go into making those prices. And we think it's important for producers and consumers to have a strong dialogue about how best to deal with this. And, of course, as the president has said, we retain all the various tools we have at our disposal for having to deal with this as well.

Finally, just in conclusion, just the evolving security environment that Frank has referred to and laid out well in the framing slides, is one that will define our activity going forward, this interconnection between national security and economic security, between economic security and energy security, between that and climate change is a seamless series of concerns and initiatives that have to be pursued simultaneously.

It involves a broader role – a broader array of countries that have traditionally been at the center of attention, and we need to find better and more effective ways of dealing with them. And it requires us being willing to use all the tools and resources at our disposal, both domestically and internationally, to try and solve these problems.

MR. VERRASTRO: Thank you. (Applause.)

OK, so we seem to have reached a commonality of the complexity of the water frontier. Two things: Mike has to go back to the White House, so we're going to abbreviate the Q&A session. What we had intended to do was to sit down and have a discussion; then we would open it up for questions.

Let me just pose one question to all three of our panelists while you are all formulating your questions, because we actually get more out of the give and take that we get from the audiences. And that question would be, so, there's long-term trends and implications of what we do. In the next 12 to 24 months, what can we do better? What do you see happening on the

environmental, economic – given our deficit reduction targets – and energy fronts? And where can we go to actually put ourselves in a better position?

So I guess I'll start with John and work my way across –

(Cross talk.)

MR. HESS: I discussed it and talked about what can we do now, because I do think we need more clarity in what we can do now.

On the demand side, I really think being clear about the automotive standards, working with the automotive industry to really push conservation, to put the higher miles per gallon. I think we're too slow on that. I realize the automotive industry is coming out of, you know, a near-death experience.

But having said that, I don't think we can wait. I think we really need to get hybrid technology out there, be it in SUVs or be it in smaller cars. That's number one.

Number two, I mentioned the offshore. We need to put the offshore back to work. We have to do that. And I also think we cannot take policies that will reduce drilling in this country. We need to increase drilling in this country. So, I think those are specific things.

Natural gas – you know, just being clear on going forward. The role of natural gas and electric generation I think also could accelerate our economic security.

MR. VERRASTRO: So just to stay on that for a second, would you advocate that the industry stepping up like they did in marine spill to kind of move the ball forward, whether –

(Cross talk.)

MR. HESS: Yeah, I think the industry has been slow out of the gates. I mean, the industry has, for the most part, done a good job on hydraulic fracturing, going back to 1949. Having said that it is a public policy issue –

MR. VERRASTRO: Right.

MR. HESS: – and the industry shouldn't be on its back feet. It should be on its front feet. I know John Deutch is working on it and I know your group is working on it.

So I do think there's certain things federally we can do. I think just like we're going to have a group for industry standards and practices for the offshore we should have it for the onshore, but we shouldn't over-regulate because the states do a good job.

So I think maybe having a superstructure on what the standards are, and maybe having some group that audits those standards is good. If we're going to do it in the offshore, we should do it in the onshore. The industry should be a little more forward-leaning on that one.

MR. VERRASTRO: Great.

Phil, do you want to talk a little bit about Capitol Hill? And then I can branch out to –

MR. SHARP: Well, I generally agree with what John said. It seems improbable we'll see any grand initiatives on energy policy out of this very difficult political situation in the country where both sides are trying to establish who really has the will of the people behind them.

But I think there are going to be some important opportunities to sort out. We have adopted a plethora of policies over those last six or eight years of interventions in the economy. Some of them are worthy and worth keeping. Many of them probably have questions.

And where it's going to come to a head is, what are the expenditures we're making, and what are the tax expenditures we're making on energy? And there needs to be some fast sorting out, and I strongly urge the administration to decide as quickly as they can which of those things are worth fighting for – and the industry, by the way, too – which are worth fighting for and trying to preserve and give up the others, because we've got a severe deficit problem.

But one thing is I would hope we would at least keep our eye on trying to get technological long-term investment continue in terms of our R&D. It's always hard to know how you manage that effectively, but make sure we do not drop the ball on that, as a minimum kind of proposition.

I do think on the nuclear thing, we just have a number of things that have to be highly focused on. That's what both the industry and the Nuclear Regulatory Commission are in the follow up to Fukushima, to decide whether there are any significant changes for current plants or plant life extension or even on the new designs that are on the board that may or may not pan out in the marketplace kind of thing.

So those need to be resolved, but you can't do that at high speed. You've got to do that deliberately. We're not going to make a decision the way Germany did, yes or no kind of thing.

So there are several of these things – and I do think on the natural gas, though, the sooner – and I'm glad to see the administration is trying to pull people together – the sooner we can get some clarity on how far are we really need to go so that we can make sure industry and others can go forward, I think that a very useful thing.

Finally, I'd just say, look, we need the Environmental Protection Agency to carefully pick the most flexible path as they try to impose carbon rules in this. That path is not my or most people's preferred way to do this. We would be better off to have a pricing strategy that allowed time and took the incentives in our capital society.

But it's the only one on the board, and if they manage that well, it can work. It's not the idea way to go, and it can give some clarity to the fact that we're going forward. Now, frankly,

most people in the utility industry and most people in most industries know it's only a matter of time that we're going to have carbon constraints of some sort. They thought it was going to come earlier until the failure last year.

MR. VERRASTRO: OK.

And, Mike, where would you like to be a year from now – other than the Bahamas?

MR. FROMAN: Right. (Laughter.)

Yeah, I think – just to follow on what John and Phil said, I think all these things are urgent to get done, but I think if we can come up with a fracturing answer that makes sense, provide clarity so that people can make investment decisions accordingly, that will be very important.

I think continuing to take a pragmatic approach and building out through – the next round will be in Durbin – the climate change framework that sort of creates concreteness around the commitments of China, India, Brazil and others, and puts in transparency mechanisms as well, sort of taking pragmatic steps on all these fronts to move forward, that would be a good set of developments.

MR. VERRASTRO: OK, excellent.

All right, so let me do this: We're going to take three questions from the audience. We'll then offer them to our panelists to respond. We have two simple rules here. One is identify yourself. You're going to have to wait for the mike. This is a big room. And to the extent that you can pose your question in the form of a question, that would also be really helpful.

So we'll start on this side. If you could stand up so the mikes can get to you, that would be great.

Q: Andrew Ellis (ph), General Electric.

As we seek to solve this security dilemma by reducing imports of hydrocarbons, we're using hydroelectric vehicles, renewable technologies, energy efficient technologies. Those all require large amounts of rare earth metals, currently supplied by one country, 95 percent of which one country uses that as a political and economic tool.

I was hoping you could address the U.S. government's focus on this issue as, you know – so we don't create one new energy security threat as you seek to solve the other one.

MR. VERRASTRO: Excellent point. OK, so the rare earth minerals.

OK, then we'll go right to the middle here, on the aisle, the gentleman with the – they're coming from behind you.

Q: Ah. Ed Berger (ph). Let me focus on the issue of demand, and particularly the transportation sector.

You've all made eloquent comments about the importance of reducing the – or increasing the efficiency of transportation, but none of you has addressed the issue of mass transportation, in fact replacing or supplementing the use of – the transportation of both goods and people around the country. I think we should think about that.

MR. VERRASTRO: OK, and we'll take a third question, all the way in the back.

Q: This question is for Mr. Froman. Tom Doggett with Reuters. I just wanted to get your thoughts on OPEC's decision today not to raise output. What does that say about the U.S. influence with Saudi Arabia, because I know the U.S. and the IEA, other Western countries that urged OPEC to increase output because of expected higher demand in the second half of the year. And have we lost – are we now in a battle with OPEC? And do you expect the Saudis to step up and increase output on their own?

MR. VERRASTRO: All right, so –

MR. HESS: I'm happy to do the OPEC first, if that –

MR. VERRASTRO: All right, why don't we start with OPEC?

MR. HESS: I'll let Mike work on rare earth. (Laughter.)

You know, there's a lot of misinformation about who's producing what.

MR. VERRASTRO: Right.

MR. HESS: The world oil market is not under-supplied. OPEC had had a production target for the OPEC '11 – Iraq's out of that for '12 – of about 24.5 million barrels a day. They've been producing way in excess of that for the last several years as the world economy, including our own country, has recovered.

So, you know, I would say, in that, the country that should be most complemented and appreciated is Saudi Arabia, because they have increased their production to meet the world oil demand. And as Libya went down, Saudi Arabia went up. Numbers for Saudi Arabia production now are probably between 9.2 (million) and 9.5 million barrels a day. During the economic crisis it was between 7.5 (million) and 8 million barrels a day.

So, the world is getting the oil it needs. OPEC may not have the political optics it needs because, for whatever the reasons may be, Venezuela and Iran have a very different political agenda than Saudi Arabia does, but Saudi Arabia is truly the “federal reserve” of oil prices. It has to maintain the supply the world needs for price stability.

So, regardless of not having an agreement, I think the oil will be produced. I think Saudi will be at the front of making sure the world has price stability.

So, while the organization is going through difficulties now in terms of getting alignment, they've had these difficulties before, but in the meantime, Saudi will play the leadership role that it has and will continue to play.

MR. VERRASTRO: Thank you.

Do you want to comment?

MR. FROMAN: I'm going to disappoint my friends from Reuters by simply saying I'm not going to give a public comment until I can actually go back to the office and evaluate what's actually been said –

MR. VERRASTRO: Been said? (Laughter.)

MR. FROMAN: – and done. But we'll be back in touch later, no doubt.

MR. VERRASTRO: Boy, picky, picky, picky.

Our numbers show that OPEC production was at least a million-and-a-half, 2 million barrels a day above quota for the OPEC '11, and there's only a handful of companies – or countries with spare capacity, and we know who they are. And a lot of the hawks are the ones that don't have spare capacity.

So, at these price levels, you would expect that they would continue, but Minister Naimi is going to make a statement.

Phil, do you want to add anything?

MR. SHARP: It clearly is – John was pointing out there is a distinction between the formal public announcements and agreements and the real-world activity. And, in fact, even those numbers that we put out, or put out regularly, are always questioned. It's hard enough to get accurate numbers within the United States, let alone universally.

So it's just a cautionary note. Don't put too much stock, in American politics or foreign politics, in what is said, but what is done is what matters.

MR. VERRASTRO: Rare earth elements, and the different supply chains for renewables, and also for refinery catalysts.

MR. FROMAN: Well, I would only – I'd simply say it's been interesting to see the reaction in the rare earths world, the developments over the last year or so in that area. I mean, as you know, I'm sure, you know, rare earths are anything but rare. They do exist in many

places. And the prospect of supply potentially being disrupted has led companies from California to Russia to elsewhere to begin to develop them as quickly as possible.

So, it's a case in which the prospect of interruption has led to a reaction by the private sector, and I'd also say we're in dialogue through the G-20 and elsewhere with a whole range of countries about raw materials generally, restrictions on raw materials generally, including rare earths.

MR. SHARP: That's one of the solvable problems, pretty easily and pretty quickly, actually.

MR. VERRASTRO: Because they're not really rare, for starters.

All right –

MR. HESS: You get to do public transportation.

MR. SHARP: Oh, well, public transportation, we didn't, and it certainly is relevant. But I think it has a broader relevance. The question is, is whether we want to have a modern infrastructure in this country or not. And I think part of any modern industrial society is to have some kind of light rail or full rail transportation system. And I think we ought to wise up to it, and that's a good economic stimulus thing that we could have been investing in and could – and of course they did try and invest in some super high-speed rail.

By the way, I rode on the trains, as everybody has here, probably, out of Beijing, and it's phenomenal and everything like that, but of course now the stories we're hearing is there are all kinds of problems with quality control and speeds having to be slowed down, and various construction problems. So, it doesn't work all perfectly. You've got to work well.

MR. VERRASTRO: The final thought, John, in terms of –

MR. HESS: Well, on the subject in general or –

MR. VERRASTRO: Yeah.

MR. HESS: – or just mass transportation.

MR. VERRASTRO: No, just on the subject in general.

MR. HESS: I think our country is a great country, and it is a time for us to rise to the occasion of leadership, both for future generations as well as the world. I know we're up to it. And there is more commonality in the beliefs, but I think we need to translate those concepts to action. And that's where I think we're dragging, in part because of the partisan politics and in part because some of these are tough decisions.

And I hope our business and political leadership have the courage to make the tough decisions to get this country on the right track in terms of energy security.

MR. VERRASTRO: Phil?

MR. SHARP: A closing comment?

MR. VERRASTRO: Yeah.

MR. SHARP: Yeah, no, I think – I mean, we have serious intellectual work and serious political work to do for this future. China is providing us an enormously valuable service, and that is it is the only thing that seems to unite this society at the moment in Washington. (Laughter.) It's the constant discussion about China and either they're doing phenomenal things or they're screwing it up or they're a threat, or whatever it is.

And they're doing for us what the Japanese did in the 1980s, which was it was amazing how they were going to totally surpass us and take over. China is a larger threat in that regard, if you view that as a threat, than Japan was. But the reality is we're going to, I hope, begin to make decisions accurately and focus on these issues more hard, in part because of China.

MR. VERRASTRO: And, Dr. Froman?

MR. FROMAN: I agree with all that. I think –

MR. VERRASTRO: America is a great country.

MR. FROMAN: – America is a great country. (Laughter.)

(Cross talk.)

MR. FROMAN: And, Jeff, I'll say that on the record. (Laughter.)

America is a great country. We do need to rise to the challenges. We have a lot of work to do. And, as Phil said, I think what's most important is that we do get government, politics, business, the environmental community, all the stakeholders working together on these things, whether it's one – none of these issues can be solved by one sector alone, and we need everybody pulling to get them solved.

MR. VERRASTRO: That was my line on collaboration.

If you could all join me in thanking this exceptional panel. (Applause.) And thank you so much, John, Phil and Mike.

(Cross talk.)

MR. VERRASTRO: Thank you.

(END)